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railway projects. The statement of accounts showed a balance in hand of £191 on an income of £1,177.

THE *Elektrische Zeitung* publishes in its issues for July a long article by Dr. Zickler on telegraphy by means of ultra-violet light. According to the abstract in the *Electrical World*, it appears that he proposes a new system of wireless telegraphy, the chief object of which is to overcome the objection to the electromagnetic wave system which lies in the fact that these waves are distributed in all directions, and cannot be concentrated in one direction, all methods for doing this having apparently failed. The principle of his method, which it seems he has tried with success, is based on an observation first made by Hertz—namely, that light rays of short-wave length, especially the ultra-violet rays, have the property of promoting electric discharges—and his receiver is based on this fact. The transmitter consists of an arc light, the rays of which are condensed with lenses or reflectors into the direction in which they are to be sent, and at the receiving end the ultra-violet rays promote the discharge in a spark gap, which discharge will give rise to electric waves, which operate a coherer and through this a bell, a telephone or an ink writer; the apparatus is shown by means of diagrams. The condensing lens on the transmitter must be made of quartz, and not of glass, as the former will transmit the ultra-violet rays and the glass will not; these ultra-violet rays are shut off intermittently as desired, by means of a glass plate, which is moved rapidly in front of the camera like a shutter on an ordinary photographic camera; the ultra-violet rays will, in this way, be cut off, while there will be no apparent effect on the light rays, and for this reason the secrecy of the message will be preserved; the ordinary searchlights could be arranged to be used for the transmitter. The receiver consists of a glass tube, one end of which is made of a plate of quartz, so as to allow the ultra-violet rays to enter; these fall on a small, slanting plate in the tube, and forming one of the electrodes of the spark gap; 10 mm. from this is the other electrode, in the form of a small ball; both electrodes are mounted with platinum; the air in the tube is exhausted to a

certain degree, or is filled with a rarefied gas; the electrodes are connected with the secondary of a small induction coil, the knob being the anode and the disc the cathode; the induction coil need only give a spark of 1 to 2 cm. and should be provided with an adjustable resistance for regulating the voltage, so that it will be just insufficient to produce a spark when no rays fall on the gap; whenever the rays are received a discharge will take place; a coherer in the immediate neighborhood may be used to produce a call or any other signals. If the signals are merely to be made audible a telephone in the discharge circuit is sufficient. He begins the description of the results of a very large number of experiments which he has made, mostly with crude apparatus. He found that platinum was by far the best material for the electrodes, the charge between which is to be effected by the light; the question of the best shape of the electrodes was not so easily answered, and no definite results were obtained; the air surrounding the spark gap of the receiver was exhausted to 200 mm., which gave better results; the first tests were made at very short distances, and were then increased to 50 meters, at which very satisfactory results were obtained. Some deductions are then made from this data for greater distances, and he shows how much the light must be increased with the distance; with a 25-ampere lamp provided with a suitable reflector he thinks it will be possible to telegraph in this way to a distance of a number of kilometers; experiments with greater distances are to be carried out.

UNIVERSITY AND EDUCATIONAL NEWS.

THE London University Commission Bill has been finally passed both by the House of Commons and by the House of Lords, and London will have a teaching university as soon as royal assent has been added.

ANOTHER extremely important educational advance in Great Britain is announced in the introduction of a bill into Parliament by the government reconstructing the entire system of secondary education. There will be a comprehensive educational department presided over by a Minister of Education.

KANSAS CITY UNIVERSITY has received about \$10,000 by the will of the late John Brown, of Chilhowee.

A NEW machinery building is under construction for the mechanical department of the University of Tennessee. The University lights its own buildings and the increased demand for light will be met by a direct connected generating set placed in the new machinery building. The machine shops will also be driven by electricity from the same plant, doing away with all belting and line shafting. The new building will also contain an electrical testing room for such tests as cannot be made at the laboratories of the electrical engineering department. The old machine shop is being rebuilt to furnish an additional dormitory.

THE Commissioners for the Exhibition of 1851 have made their appointments to science research scholarships for the year 1898 on the recommendation of the authorities of the respective universities and colleges. The scholarships are of the value of £150 a year, and are ordinarily tenable for two years (subject to a satisfactory report at the end of the first year) in any university at home or abroad, or in some other institution approved of by the Commissioners. The scholars are to devote themselves exclusively to study and research in some branch of science the extension of which is important to the industries of the country. A limited number of the scholarships are renewed for a third year where it appears that the renewal is likely to result in work of scientific importance. Five scholars have been appointed for a third year, seventeen have been appointed for a second year, and thirteen new appointments have been made. Three of the scholars will work in the United States, one at Harvard, one at Cornell and one at Columbia.

A BILL has been introduced into the British House of Commons forbidding anyone to attach to his name a degree obtained abroad, without giving the source from which it has been received.

FROM official statistics published by the Minister of Public Instruction and summarized in the *British Medical Journal* it appears that on January 15, 1898, the total number of stu-

dents in the faculties and schools of superior instruction in France was 28,782. Of this number 27,911 were men, 26,419 being French, and 1,492 foreigners; and 871 were women, of whom 579 were French and 292 foreign. The total number of students in the several faculties and schools of medicine was 8,064, of whom 399 were women; of the whole number 734 male and 168 female students were foreigners. The 'extra-legal' schools of medicine outside the universities had 949 students, of whom 70 were women; while the medical schools at Algiers had 763, of whom 24 were women. There are in Paris 11,647 students, of whom 3,971 are students of medicine. Next to Paris in respect of student population comes Lyons, with 2,335, of whom 1,106, including 33 women, belong to the medical faculty. Bordeaux occupies the third place, with 2,144, of whom 737 are students of medicine. Toulouse, Montpellier, Lille, Rennes and Nancy have each over 1,000 students.

DR. JOHN C. THRESH has been appointed lecturer on public health at the London Hospital Medical College new laboratories, and a public health museum will be opened at the College at the beginning of the next session.

DISCUSSION AND CORRESPONDENCE.

AN AMERICAN BLUE GROTTO.

MANY of the beautiful phenomena seen at the celebrated Blue Grotto of the island of Capri are reproduced on a small scale in a cavern at Lake Minnewaska, New York. This lake is situated on the Shawangunk range of mountains at an elevation of about 1,700 feet; it lies in a basin, excavated in glacial times, about half a mile long and less than a quarter in width, and of a depth reaching seventy feet. The rock on all sides is a white quartzite known as Shawangunk grit, which rests upon shale, but no outcrop of the latter is visible at the lake. The quartzite is compact to granular and contains in places pebbles of white quartz; it is very free from feldspathic admixture, so that it yields to the water very little soluble matter. Bare cliffs rising to the height of 150 feet bound the east side of the lake, while the western banks